Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 7 (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Is Preemptive Analgesia with Pregabalin effective in Total Knee Replacement? A Prospective Study

Selvamari Mariappan[1*], Satish Kumar[2], Ashok Kumar[3]

[1]Assistant Professor, Department of Orthopaedics, Dhanalakshmi Srinivasan Institute of Medical Sciences and Hospital, Perambalur, Tamilnadu, India

[2]Professor, Department of Orthopaedics, Atal Bihari Vajpayee Institute of medical sciences and Dr Ram Manohar Lohia Hospital, New Delhi, India

[3]Associate Professor, Department of Orthopaedics, Venkateshwara Institute of Medical Sciences, Gajraula, Uttar Pradesh, India

***Corresponding Author:** Selvamari Mariappan

Email ID: adhrithhospital@gmail.com

Cite this paper as: Selvamari Mariappan, Satish Kumar, Ashok Kumar, (2025). Is Preemptive Analgesia with Pregabalin effective in Total Knee Replacement? A Prospective Study *Journal of Neonatal Surgery*, 14 (7), 241-244.

ABSTRACT

Introduction:

The aim of the study is to assess the effectiveness of preemptive analgesia with Pregabalin In controlling Post Operative pain.

Materials and Methods:

A total number of 50 Patients who had moderate to severe OA knee who wanted to get Total Knee Replacement were included In the study. Inclusion Criteria includes Moderate to Severe OA Knee, Moderate to Severe deformity. Exclusion Criteria includes Patient who had Uncontrolled Diabetes, allergy/ intolerance to drug.

50 patients were randomly allocated into two groups namely Group A (Pregabalin) and Group B (Placebo). Group A received 150mg of Pregabalin one hour before the surgery and Group B received Placebo. Pain assessment was done using VAS scale at six hours, one day and one week after surgery.

Results:

At six hours Post OP, Mean VAS Score was 2.04±1.09 for Group A and 4.80±1.02 for Group B which indicates Pregabalin group had significant reduction of pain after surgery. The pain scale between the groups one day after surgery was 3.12 ±1.33 for Group A and 5.40 ±1.29 for group B. There was a significant decrease in pain score in Group A (Pregabalin) than in Group B. Figure 3 represents the pain scale between the groups after one week of surgery. Mean VAS for Group A was 6.96 ±1.05 and 7.86 ±0.93 for Group B. There was no significant decrease of pain after one week of surgery.

Keywords: *Total Knee arthroplasty, TKA, Total Knee replacement TKR, Osteoarthritis (OA Knee), Knee replacement.*

INTRODUCTION

Osteoarthritis of the knee (OA) is the most common reason for the pain and deformity in elderly and its prevalence is around 20%. Still the prevalence is increasing. (1,2)Though there are several medical treatments available for OA Knee, Total Knee Replacement (TKR) is one of the most common surgical procedure for moderate to severe OA knee. (3) However TKR is always associated with moderate to severe pain atleast for 2 weeks post operatively. Some authors have reported that pain in TKR is more painful compared to other Orthopedic Procedures. (4) Effective pain control before the procedure is vital for post operative outcomes. Because acute pain creates negative impact on knee functional recovery, sleep, prolonged stay and finally the quality of life (5).

The mechanism of pain in the post operative period is complicated. It was believed earlier that pain after the surgery was nociceptive which was caused by trauma during surgery and inflammation (6). But recent studies have reported that repeated sensory stimulation caused by inflammatory mediators leads to a large sensitization of pain sensory nerves results in neuropathic pain.(7,8). Therefore analgesic effect of single drug isn usually not sufficient and multimodal analgesia is hence considered after TKR(9). Multimodal analgesia combines analgesics drugs of different mechanism to achieve synergistic/ additive effect.

Preemptive analgesia is one of the important part of it which involves various pain control measures are given in advance to inhibit the central and peripheral pain sensitization. Thereby reducing the intensity of pain following TKR. This improves early mobilization, reduces opioid dependence and fastens rehabilitation. (10) reported multimodal analgesia significantly reduced pain in immediate post op period. According to some authors pre emotive analgesia significantly reduces the risk of pain progression. (12)

Pregabalin acts by binding to the α2δ-1 subunit of voltage-dependent calcium channels, reducing excitatory neurotransmitter release and thereby decreasing neuronal excitability(11). Effect of pregabalin on post operative pain management has got mixed results.

This prospective study aims to check the effectiveness of pre emptive analgesia with Pregabalin in controlling the pain post operatively.

Materials & Methods:

After obtaining written consent from the patients, a total number of 50 patients with moderate to severe Osteoarthritis of knee who were to undergo primary TKR from a time period of 2 years got enrolled for the study. Age of the patients ranged from 50-68 years. Inclusion Criteria were moderate to severe OA knee, moderate to severe deformity. Exclusion criteria included uncontrolled Diabetes, allergy/ intolerance to the drug given, Chronic Pregabalin use (more than 3 months), Chronic Opioid/NSAIDS use (more than 3 months).

Patients were randomly assigned to two groups, Group A & Group B with 25 patients each. Group A received 150mg of Pregabalin and Group B received Placebo 1 hours prior to surgery. Postoperatively both Groups received Paracetamol 1gm IV stat. Pain was assessed using Visual Analog Scale (0-10)) being the lowest and 10 being the severe pain. Pain was assessed after six hours, one day and one week after surgery.

Results:

Using SPSS software results were obtained. Group A received 150mg of Pregabalin one hour before the surgery and Group B received Placebo. The mean age of the patients were 57.4± 8 years (Range 50-68). At six hours Post OP, Mean VAS Score was 2.04±1.09 for Group A and 4.80±1.02 for Group B which indicates Pregabalin group had significant reduction of pain after surgery(Fig 1). The pain scale between the groups one day after surgery was 3.12 ±1.33 for Group A and 5.40 ±1.29 for group B (Figure 2). There was a significant decrease in pain score in Group A (Pregabalin) than in Group B. Figure 3 represents the pain scale between the groups after one week of surgery. Mean VAS for Group A was 6.96 ±1.05 and 7.86 ±0.93 for Group B (Figure 3). There was no significant decrease of pain after one week of surgery.

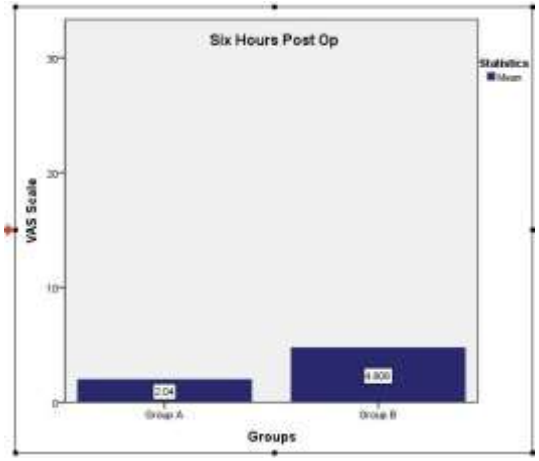

Figure 1: Pain scale between Group A and Group B after Six hours Post OP

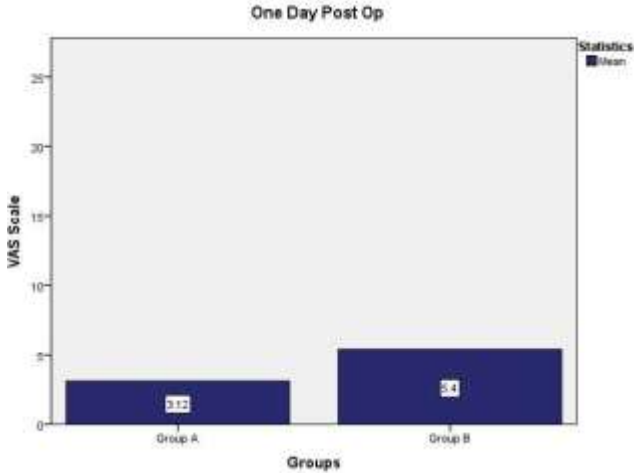

Figure 2: Pain Scale between Group A and Group B one day after surgery

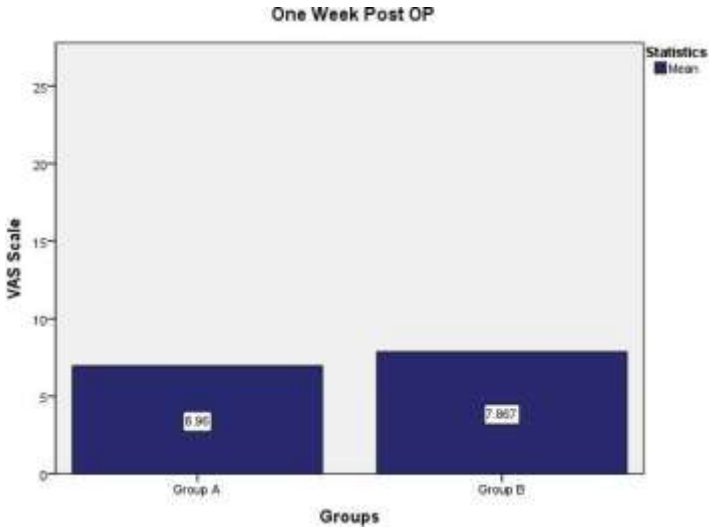

Figure 3: Pain Scale between Group A and Group B after One week of Surgery

Discussion:

Preemptive analgesia prevents central sensitisation and reduces post operative pain by proving analgesics before surgical stimulus. Total Knee Replacement is associated with severe pain which affects post op mobilization, recovery and function. Preemptive analgesia in TKR offers good pain control and reduces the use of Opioids , thereby enhances rehabilitation. (13) reported preemptive analgesia reduces the risk of post operative pain especially in Replacement surgeries. Also (14) stated that Gabapentanoids reduces intensity of pain in the early post operative period which align with our findings.

Pregabalin in Preemptive Analgesia

Mechanism of action of Pregabalin is explained in Fig 1. Pregabalin acts by binding to the α2δ-1 subunit of voltage-dependent calcium channels, reducing excitatory neurotransmitter release and thereby decreasing neuronal excitability(11). It modulates central sensitization by inhibiting Ca Channels which makes it effective in controlling post operative pain especially in Replacement surgeries(15,16).

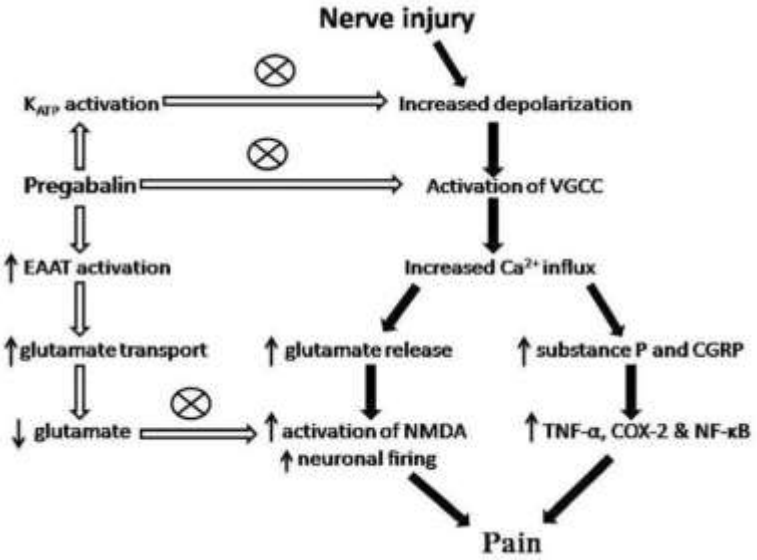

Figure 4: Mechanism of action of Pregabalin

In a study by Kim et al (15), Preemptive analgesia with pregabalin (150-300mg) reduced pain in the post op period and also improves functional recovery following TKR. Similarly a study done by Moore et al concluded the use of Pregabalin as a part of multi modal analgesia , decreases the intensity and post op opioid consumption which supports our study.

The result of this study align with the reports of multiple studies supporting the role of preemptive analgesia with Pregabalin especially in TKR. (14) stated the importance of multimodal analgesia, incorporating preemptive analgesia for both nociceptive and neuropathic pain.

The critical factor in TKR is effective pain control and functional recovery. The result of this study is to explain the importance of preemptive analgesia with Pregabalin in controlling acute post operative pain, which facilitates early mobilization, and to minimise the post op opioid consumption.

Limitations

Certain limitation of the study is a small sample size, lack of data on adverse effect of the drug.

Conclusion

This study evaluated the effectiveness of preemptive analgesia with Pregabalin in controlling post op pain following TKR. The findings of the study demonstrated the use of pregabalin reduces the pain post operatively especially at six hours and one day following the surgery.

REFERENCES

1. Fan Z, Yan L, Liu H, Li X, Fan K, Liu Q, et al. The prevalence of hip osteoarthritis: a systematic review and meta-analysis. Arthritis Res Ther. 2023;25(1):51.
2. Giorgino R, Albano D, Fusco S, Peretti GM, Mangiavini L, Messina C. Knee osteoarthritis: epidemiology, pathogenesis, and mesenchymal stem cells: what else is new?? An update. Int J Mol Sci. 2023;24:6405
3. Efficacy of periarticular multimodal drug injection in total knee arthroplasty for pain management and rehabilitation. A. Osawa, K. Yoshida, H. Kanazawa, Y. Maruyama, K. Kaneko 4.W.-W. Pang, T.-C. Hsu, C.-C. Tung, C.-P. Hung, D.-P. Chang, M.-H. Huang
4. Is total knee replacement more painful than total hip replacement? Acta Anaesthesiol. Sin., 38 (3) (2000), pp. 143-148
5. Tsuji M., Kobayashi N., Yukizawa Y., Oishi T., Takagawa S., Inaba Y. Effect of flurbiprofen and S-flurbiprofen patches on multimodal pain management after total knee arthroplasty: a prospective randomized controlled trial. The Journal of Arthroplasty . 2020;35(8):2033–2038. doi: 10.1016/j.arth.2020.04.006.
6. Luna I. E., Kehlet H., Petersen M. A., Aasvang E. K. Clinical, nociceptive and psychological profiling to predict acute pain after total knee arthroplasty. Acta Anaesthesiologica Scandinavica . 2017;61(6):676–687. doi: 10.1111/aas.12899.
7. Scheuren P. S., Rosner J., Curt A., Hubli M. Pain-autonomic interaction: a surrogate marker of central sensitization. European Journal of Pain . 2020;24(10):2015–2026. doi: 10.1002/ejp.1645.
8. Koh I. J., Kang B. M., Kim M. S., Choi K. Y., Sohn S., In Y. How does preoperative central sensitization affect quality of life following total knee arthroplasty? The Journal of Arthroplasty . 2020;35(8):2044–2049. doi: 10.1016/j.arth.2020.04.004
9. Wick E. C., Grant M. C., Wu C. L. Postoperative multimodal analgesia pain management with nonopioid analgesics and techniques. JAMA Surgery . 2017;152(7):691–698. doi: 10.1001/jamasurg.2017.0898.
10. Xu H, Sun Y, Zhang Q, et al. Multimodal pre-emptive analgesia in total knee arthroplasty: Effects on early postoperative pain. Front Surg. 2021;8:718685.
11. Alles SRA, Cain SM, Snutch TP. Pregabalin as a pain therapeutic: beyond calcium channels. Front Cell Neurosci. 2020;14:83
12. Andersen L, Christensen AE, Dahl JB. Preventing chronic pain after joint replacement: The role of preemptive analgesia. Acta Orthop. 2022;93:65–73.
13. Buvanendran A, Kroin JS. Multimodal analgesia for controlling acute postoperative pain. Curr Opin Anaesthesiol. 2009;22(5):588–93
14. Kehlet H, Dahl JB. The value of “multimodal” or “balanced analgesia” in postoperative pain treatment. Anesth Analg. 1993;77(5):1048–56
15. Kim SY, Kim JE, Kim YH, Lim HJ, Lee JH, Park HS. Efficacy of pregabalin as a premedication for postoperative pain after total knee arthroplasty: a double-blind, randomized controlled study. J Clin Anesth. 2014;26(7):487–91.
16. Moore RA, Derry S, Aldington D, Cole P, Wiffen PJ. Pregabalin for chronic pain in adults with fibromyalgia, neuropathic or musculoskeletal pain: a systematic review of efficacy and safety. Cochrane Database Syst Rev. 2009;(3):CD007076